

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-13 are currently pending, Claims 3 and 11 are amended. Support for the amendment to Claim 3 may be found in Figures 17-20.

The outstanding Official Action rejected Claims 1-12 under 35 U.S.C. § 103(a) as unpatentable over the Admitted Prior Art (hereinafter APA) and Japanese Patent No. 411330759A to Tokuchi; and Claim 13 was indicated as reciting allowable subject matter.

Applicants acknowledge with appreciation the indication of allowable subject matter.

Claim 1 is directed to a high sensitivity receiver having reception bandpass filter means, a low noise reception amplifier, a laser diode for converting an output signal from the low noise reception amplifier to an optical signal to be delivered; a heat shielding box for confining the reception bandpass filter means, the low noise reception amplifier and the laser diode therein. Furthermore, the high sensitivity receiver includes a cooling means for cooling the interior of the heat shielding box.

As explained in the Specification from page 4, line 24 to page 6, line 21, Applicants' present invention is intended to improve the dynamic range of optical transmission assembly. For this purpose, instead of cooling the laser diode alone (LD), the LD is disposed together with the filter and amplifier in the heat shielding box, which are cooled down to achieve stabilization and expansion of the dynamic range as well as low loss and low noise.

Tokuchi describes a cooling box 1 having a superconducting filter circuit 11 in a low noise amplifier 12. Tokuchi further describes a heat diffusion plate 2a placed within the cooling box 1, or a cooling machine 2b is connected to the heat diffusion plate 2a.¹

¹ See Tokuchi at Solution.

Applicants respectfully traverse the rejection of Claim 1 under 35 U.S.C. § 103(a). MPEP §706.02(j) notes that to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings. The unit in Tokuchi achieves low loss and low noise (high reception sensitivity) by cooling the filter 11 and LNA 12. However, the unit described in Tokuchi does not convert the output of the LNA to an optical signal. Therefore, Tokuchi fails to disclose or suggest the idea of cooling a laser diode (LD) for converting the output of the LNA 12 to an optical signal in the cooling box 1. Accordingly, there is no motivation to cool the laser diode shown in Applicants' Figure 1 with the filter and amplifier of Tokuchi.

Thus, Applicants respectfully submit that the outstanding Official Action does not set forth a *prima facie* case of obviousness for Claim 1, and respectfully request that the rejection of Claim 1, and claims depending therefrom, under 35 U.S.C. § 103(a) be withdrawn.

Claim 2 is directed to a high sensitivity receiver where the reception bandpass filter means, the low noise reception amplifier and the laser diode are divided into *s* groups, and *the cooling means includes s cooling units, where s is an integer*. Figure 2 of Applicant's Specification illustrates a phase shifter 14, a filter 3, a LNA 4 and synthesizer 15 cooled by *a cooling member 9a*. The admitted prior art does not disclose or suggest that the *cooling member 9a is divided into s cooling units*. Furthermore, Tokuchi neither discloses nor suggests that the cooling box 1 and cooling machine 2b are *divided into s cooling units*. Therefore, Applicants respectfully request that the rejection of Claim 2 under 35 U.S.C. § 103(a) be withdrawn.

Claims 6 and 8 recite features analogous to Claim 2. Therefore, Applicants respectfully request that the rejections of Claims 6 and 8 under 35 U.S.C. § 103(a) be withdrawn.

Claim 3 is amended to recite that the phase shifter synthesizer delivers a synthesized output as a radio frequency signal “to said reception bandpass filter means.” Neither the admitted prior art nor Tokuchi disclose the amended feature. Therefore, Applicants respectfully request that the rejection of Claim 3, and claims depending therefrom, under 35 U.S.C. § 103(a) be withdrawn.

Claim 7 is directed to a high sensitivity receiver having a phase shifter synthesizer for receiving output signals from the n amplifiers as inputs and for adjusting phase differences between these output signals and for synthesizing the output signals to be input to the laser diode. Neither the admitted prior art nor Tokuchi disclose or suggest a phase synthesizer for *synthesizing the output signals to be input to the laser diode*. Therefore, Applicants respectfully request that the rejection of Claim 7 under 35 U.S.C. § 103(a) be withdrawn.

Claim 9 is directed to a high sensitivity receiver where the cooling means includes a cooling unit formed by a cooling plate and at least one other cooling unit formed by a cooling plate in combination with a heat resistance member for cooling one or more of the reception bandpass filter means, the low noise amplifier and the laser diode *to mutually different temperatures*. Neither the admitted prior art nor Tokuchi disclose or suggest cooling one or more of the filter, LNA, and LD at *mutually different temperatures*. Therefore, Applicants respectfully request that the rejection of Claim 9 under 35 U.S.C. § 103(a) be withdrawn.

Claims 10 and 11 recite features analogous to Claim 9. Therefore, Applicants respectfully request that the rejections of Claims 10 and 11 under 35 U.S.C. § 103(a) be withdrawn.

Claim 12 is directed to a high sensitivity receiver having a bias current control means for controlling a bias current supplied to the laser diode in accordance with the power level of the signal which is branched by the power distributor. Neither the admitted prior art nor Tokuchi disclose or suggest controlling a bias current of a laser diode *in accordance with the power level of a signal which is branched by a power distributor*. Therefore, Applicants respectfully request that the rejection of Claim 12 under 35 U.S.C. § 103(a) be withdrawn

Consequently, in view of the present response, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance.

Respectfully submitted,

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